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THE REPLACEMENT OF NATURAL HARD SUBSTRATA BY ARTIFICIAL SUBSTRATA: ITS EFFECTS ON SPONGES AND ASCIDIANS. *Memoirs of the Queensland Museum 44: 288. 1999*:- Subtidal reefs around coastal cities such as Sydney are composed of a variety of natural and artificial substrata. Commonly these are natural rocky reefs, breakwalls, seawalls and pier pilings. These types of hard substrata differ in their structure. Most natural hard substrata consist of horizontal surfaces; most surfaces on artificial hard substrata are vertical. Therefore, replacing natural hard substrata with artificial hard substrata is likely to change the surface of substrata from predominantly horizontal to mostly vertical. To understand and predict the potential effects of these changes on the assemblage of sponges and ascidians it is important to determine their distribution on horizontal and vertical surfaces.

The few ecological studies on the distribution of algae and invertebrates on horizontal and vertical surfaces have reported that there are more sponges and ascidians on vertical than on horizontal surfaces. It has not been tested whether these patterns exist in the temperate waters around Sydney. Furthermore, of the studies that have examined the effects of horizontal and vertical surfaces on the distribution of sponges and ascidians, none has experimentally tested the factors that cause these distributions.

Here, I present results of my tests of the hypothesis that sponges and ascidians are more abundant on vertical than horizontal surfaces in the shallow subtidal zone around Sydney. I will also discuss future manipulative experiments to determine which factors are important in creating these distributions. ❒ *Porifera, Ascidiacea, distribution, hard substrata, shallow subtidal, habitat.*

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CONVERGENCE IN THE TIME-SPACE CONTINUUM: A PREDATOR-PREY INTERACTION. *Memoirs of the Queensland Museum 44: 288. 1999*:- Community structure is influenced by many biotic and abiotic factors. Predation is a key structuring mechanism for some marine communities. Prey abundances may fluctuate with strength of predator recruitment and persistence, except in cases where some of the prey population has a refuge in space or time from predation. Consistent, moderate predation levels on a predicably available prey resource should lead to stable community structure with relatively small fluctuations in predator and prey population densities. Conversely, prey species lacking a refuge from predation are subject to major population fluctuations commensurate with strength of predator recruitment and abundance.

The sponge *Halichondria panicea* is patchily distributed in the rocky intertidal on the south shore of Kachemak Bay, southcentral Alaska, and in certain locations is the spatial dominant. At one site approximately 55m in horizontal length, *H. panicea* has dominated the mid-intertidal for at least 10 years, with low densities of potential molluscan predators such as *Archidoris montereyensis*, *Katherina tunicata*, and *Diadora aspera* present. Percent cover estimates of primary space occupiers at the site were collected from 10 0.25m^2 permanent quadrats established in August 1994. *H. panicea* averaged 53.4% +/-9.9% cover through August 1996. Other major cover categories were algae, 14.6% +/-6.4%, and open rock, 26.1% +/-10.2%. Visits to the site in early spring of 1997 revealed that the sponge colonies overwintered with few indications of major mortality events. No percent cover data were collected at that time.

Total numbers of the nudibranch *Archidoris montereyensis*, which is a specialist predator on *H. panicea*, present at the site were recorded and ranged from 12-42 from 1994-1996. In the spring of 1997, strong recruitment resulted in an average population of 151 *A. montereyensis* on site from May to July. Percent cover of *H. panicea* declined from visual estimates of 40% in May to 15% in July. By August 1997, when the 10 permanent quadrats and 10 haphazardly placed quadrats were measured, essentially no sponge could be found at the study site. After July, the abundance of nudibranchs declined to 32 individuals commensurate with sponge reduction. By September, only one small sponge colony and 7 predatory nudibranchs were present at the site. Even though *H. panicea* is abundant in the region and potential recruits should be numerous, as of April 1998, the site once dominated by *H. panicea* is predominantly open rock with some recruitment of annual macroalgae occurring. The predator-prey relationship of *A. montereyensis* and *H. panicea* is an example of a chase through space and time with convergence resulting in extreme population fluctuations and an unstable community. ❒ *Porifera, predation, nudibranch, intertidal, predator/prey interaction, community structure, Alaska, recruitment.*

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